

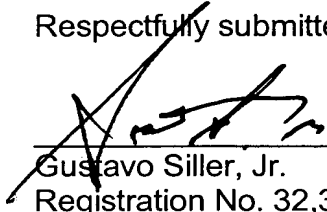
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elastically forced to contact the ball to change an operation feeling as the user rotates the knob. A car-mounted apparatus controller incorporates this type of manual input device for functional control of car-mounted electric apparatuses.

REMARKS

Applicants have rewritten portions of the specification, Claims 1, 5-8 and 12-19 and the Abstract of the Disclosure. The changes from the previous version to the rewritten version are shown in attached Appendix A, with strikethrough for deleted matter and underlines for added matter.

Respectfully submitted,



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APPENDIX A
Attorney Docket No. 9281-4256
Manual Input Device Which Provides its Control Knob With Plural Modes
of Operation Feeling, and Car-Mounted Apparatus Controller
Based Thereon
Hidetaka Numata et al.

In the Specification

Please amend the paragraph on page 15, lines 6-7 as follows:

(Amended) Figs. 17A and 17B shows the configuration of a conventional manual input device.

In the Claims

Please amend Claim 1 as follows:

1. (Amended) A manual input device comprising:
 - a knob;
 - a feeling providing ~~means~~device which ~~have~~has at least two kinds of feeling patterns; and
 - an actuator which activates the feeling providing ~~means~~device and changes an operation feeling given to the knob.

Please amend Claim 5 as follows:

5. (Amended) The manual input device according to Claim 1,
 - wherein the feeling providing ~~means~~device comprises one of a disc ~~or~~and cylinder which bears plural feeling patterns (rows) and is fixed to a control shaft to be manipulated by the knob; and one of a ball ~~or~~and pin elastically forced to contact the one of the disc ~~or~~and cylinder, and
 - wherein the actuator linearly reciprocates the one of the ball ~~or~~and pin in a direction where the plural feeling patterns are arranged.

Please amend Claim 6 as follows:

6. (Amended) The manual input device according to Claim 1,
 - wherein the feeling providing ~~means~~device comprises one of a disc ~~or~~and cylinder which has a single feeling pattern (row) and is fixed to a control shaft to be manipulated by the knob; and one of plural balls ~~or~~and pins elastically forced to contact the one of the disc ~~or~~and cylinder, and

wherein the actuator linearly reciprocates a selected one of the one of the plural balls or ~~and~~ pins in a direction where ~~it~~ the selected one of the one of the plural balls and pins selectively engages with the feeling pattern.

Please amend Claim 7 as follows:

7. (Amended) The manual input device according to Claim 1,
wherein the feeling providing means~~device~~ comprises a rotary polyhedron which bears plural feeling patterns (rows) arranged in parallel along an axial direction of ~~its~~ an outer surface, and
wherein the actuator reciprocally rotates the rotary polyhedron around ~~its~~ an axis of the rotary polyhedron, with one end of a control shaft to be manipulated by the knob being in contact with the outer surface of the rotary polyhedron bearing the feeling patterns.

Please amend Claim 8 as follows:

8. (Amended) A manual input device comprising:
a knob;
feeling providing means~~device~~ which provides the knob with an operation feeling;
an actuator which activates the feeling providing means~~device~~;
~~detecting means~~ a detector which detects an operating condition of the knob; and
an input/output section which exchanges signals with an external device controlled by the knob,
wherein the actuator is controlled according to a control signal generated based on an external signal from an external ~~detecting means~~ detector connected at least with the external device.

Please amend Claim 12 as follows:

12. (Amended) The manual input device according to Claim 8,
wherein the feeling providing means~~device~~ comprises one of a disc ~~or~~ and cylinder which bears plural feeling patterns (rows) and is fixed to a control shaft to be manipulated by the knob; and one of a ball ~~or~~ and pin elastically forced to contact the one of the ~~disc or~~ and cylinder, and

wherein the actuator linearly reciprocates the one of the ball or ~~and~~ pin in a direction where the plural feeling patterns are arranged.

Please amend Claim 13 as follows:

13. (Amended) The manual input device according to Claim 8,
wherein the feeling providing means~~device~~ comprises one of a disc or ~~and~~ cylinder which bears a single feeling pattern (row) and is fixed to a control shaft to be manipulated by the knob; and one of plural balls or ~~and~~ pins elastically forced to contact the one of the disc or ~~and~~ cylinder, and

wherein the actuator linearly reciprocates a selected one of the one of the plural balls or ~~and~~ pins in a direction where ~~it~~ the selected one of the one of the plural balls and pins selectively engages with the feeling pattern.

Please amend Claim 14 as follows:

14. (Amended) The manual input device according to Claim 8,
wherein the feeling providing means~~device~~ comprises a rotary polyhedron which bears plural feeling patterns (rows) arranged in parallel along an axial direction of ~~its~~ an outer surface, and

wherein the actuator reciprocally rotates the rotary polyhedron around ~~its~~ an axis of the rotary polyhedron, with one end of a control shaft to be manipulated by the knob being in contact with the outer surface of the rotary polyhedron bearing the feeling patterns.

Please amend Claim 15 as follows:

15. (Amended) A manual input device comprising:
a knob;
a feeling providing means~~device~~ which provides the knob with an operation feeling;
an actuator which activates the feeling providing means~~device~~;
a control section for the actuator;
~~detecting means~~ a detector which detects an operating condition of the knob; and
an input/output section which exchanges signals with an external device controlled by the knob,

wherein an external signal from an external detecting means~~detector~~ connected at least with the external device is inputted into the control section through the input/output section to generate a control signal for the actuator to match at least the external signal, and wherein the actuator is controlled according to the control signal.

Please amend Claim 16 as follows:

16. (Amended) A manual input device comprising:

a knob;

a feeling providing means~~device~~ which provides the knob with an operation feeling;

an actuator which activates the feeling providing means~~device~~;

a control section for the actuator;

~~detecting means~~a detector which detects an operating condition of the knob; and

an input/output section which exchanges signals with an external device controlled by the knob,

wherein both a detection signal at least from the ~~detecting means~~detector and an external signal from an external detection means~~detector~~ connected with the external device are inputted into the external device to generate control information for the actuator to match the detection signal and the external signal, wherein the control information is picked up by the control section through the input/output section to generate a control signal for the actuator to match the control information, and wherein the actuator is controlled according to the control signal.

Please amend Claim 17 as follows:

17. (Amended) A manual input device comprising:

a knob;

a feeling providing means~~device~~ which provides the knob with an operation feeling;

an actuator which activates the feeling providing means~~device~~;

~~detecting means~~a detector which detects an operating condition of the knob; and

an input/output section which exchanges signals with an external device controlled by the knob,

wherein both a detection signal at least from the detecting ~~means~~detector and an external signal from ~~an external detection means~~detector connected with the external device are inputted into the external device to generate a control signal for the actuator to match the detection signal and the external signal, and wherein the actuator is controlled according to the control signal.

Please amend Claim 18 as follows:

18. (Amended) A car-mounted apparatus controller comprising:

a function selection switch ~~for selecting~~to select one function among various functions to be controlled; and

a manual input device ~~for~~to controlling the function selected by the function selection switch,

the manual input device comprising:

a knob;

a feeling providing means~~device~~ having at least two kinds of feeling patterns; and

an actuator ~~for~~to ~~activating~~activate the feeling providing ~~means~~device and changing an operation feeling given to the knob.

Please amend Claim 19 as follows:

19. (Amended) A car-mounted apparatus controller comprising:

an electric apparatus selection switch ~~for~~to selecting an electric apparatus to be controlled;

a function selection switch ~~for selecting~~to select one of various functions of the electric apparatus selected by the apparatus selection switch; and

a manual input device ~~for controlling~~to control a function selected by the function selection switch,

the manual input device comprising:

a knob;

a feeling providing means~~for providing~~device to provide the knob with an operation feeling;

an actuator ~~for activating~~to activate the feeling providing ~~means~~device;

~~detecting means for detecting~~ a detector to detect an operating condition of the knob; and

an input/output section which exchanges signals with an external device controlled by the knob,

wherein the actuator is controlled according to a control signal generated based on both a detection signal at least from the ~~detecting means~~ detector and an external signal from ~~an external detecting means~~ detector connected with the external device.

In the Abstract of the Disclosure

Please amend the Abstract of the Disclosure as follows:

(Amended) ABSTRACT OF THE DISCLOSURE

~~This invention provides a manual input device by which the~~ A changeable operation feeling (tactile sensation) ~~is provided to the~~ for a user manipulating its ~~the knob of manual input device can be changed as appropriate, and also a car-mounted apparatus controller which uses this type of manual input device. A~~ The manual input device comprises: a housing; a control shaft which is rotatably supported by the housing; a knob fixed to one end of the control shaft; and feeling providing means, actuator and first and second position sensors which are all housed in the housing. The ~~includes a feeling providing means comprises: device which has plural discs fixed to the~~ a control shaft, bearing first to third feeling patterns on their circumferential surfaces; and a ball holder which works in conjunction with the discs to provide an operation feeling to the knob. The ~~An~~ An actuator is driven to move up or down the ball holder to select the feeling pattern to be elastically forced to contact the ball to change an operation feeling as the user rotates the knob. ~~The~~ A car-mounted apparatus controller incorporates this type of manual input device as ~~means for functional control of car-mounted electric apparatuses.~~